9.5 notes math 1010

Common and Natural Logarithms

(pg. 619 – 623)

Common Logarithms $\log X$ means $\log_{10} X$

Natural Logarithms $\ln X$ means $\log_e X$

You can use your calculator to find approximations for common logarithms (base 10) and natural logarithms (base e)

Examples:
Use a calculator to approximate each number to four decimal places.

$\log 5312$ $\qquad\qquad$ $\dfrac{\log 6500}{\log 0.007}$

Use a calculator to approximate $10^{3.417}$ to four decimal places

The Number e: $e \approx 2.7182818284$

Change of Base
For any logarithm bases a and b, and any positive number M, (If a, b, and M are positive real numbers and neither b nor M is 1), then

$$\log_b M = \frac{\log_a M}{\log_a b}$$

Examples:
Find $\log_5 8$

Find $\log_4 31$

Graphs of Exponential and Logarithmic Functions, Base e

Graph $f(x) = e^x$ *and* $g(x) = e^{-x}$ and state the domain and the range of e^x

Graph $f(x) = e^x + 2$ and state the domain and the range of *f*.

Graph and state the domain and the range of each function.

$g(x) = \ln(x)$ $f(x) = \ln(x+3)$